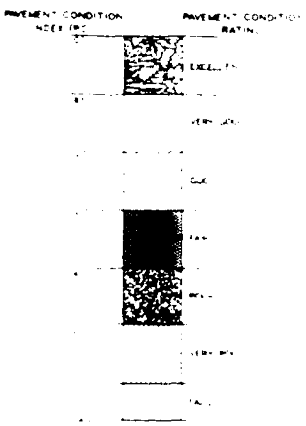
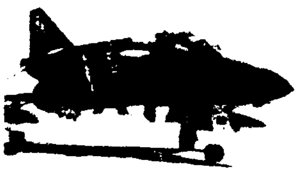
US Army Corps of Engineers

AD-A224 978





MISCELLANEOUS PAPER GL-90-7

CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE (NORTH BASE), CALIFORNIA

by

Ross A. Bentsen

Geotechnical Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199

June 1990

Final Report

Prepared for DEPARTMENT OF THE AIR FORCE
Edwards Air Force Base, California 93523-5320

Under MIPR No. F04611-89-X-0091

GEOTECHNICAL LABORATORY

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Miscellaneous Paper GL-90-7	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION USAEWES Geotechnical Laboratory 6b. OFFICE SYMBOL (If applicable) CEWES-GP-T	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) 3909 Halls Ferry Road Vicksburg, MS 39180-6199	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION US Air Force 8b. OFFICE SYMBOL (If applicable) AFFTC/PKOS	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MIPR No. F04611-89-X-0091
8c. ADDRESS (City, State, and ZIP Code) Edwards Air Force Base, CA 93523-5320	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Condition Survey and PAVER Implementation, Edwards Air Force Base (North Base), California

12. PERSONAL AUTHOR(S)
Bentsen, Ross A.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final report	FROM ______ TO ______	June 1990	31

16. SUPPLEMENTARY NOTATION
Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	Airfield pavement	Pavement condition
			Edwards AFB (North Base)	Pavement condition index
			Micro PAVER	PAVER implementation

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

A pavement condition survey was performed on the North Base airfield at Edwards Air Force Base, California, in August 1989 for the purpose of determining the pavement condition index of the airfield features and for performing the initial implementation of the PAVER pavement management system. The pavement identification and condition survey data were input into a Micro PAVER data base.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code) / 22c. OFFICE SYMBOL

DD Form 1473, JUN 86 — Previous editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

PREFACE

The condition survey described in this report was requested by Military Interdepartmental Purchase Request (MIPR) No. F04611-89-X-0091 dated 17 February 1989 from AFFTC/PKOS, Edwards Air Force Base, CA, to the US Army Engineer Waterways Experiment Station (WES), Vicksburg, MS.

The condition survey of the North Base Airfield at Edwards Air Force Base was performed by a WES condition survey team during the period 1 to 3 August 1989. The team consisted of Messrs. R. A. Bentsen, W. P. Grogan, G. L. Carr, Sr., D. D. Mathews, and R. T. Graham, Pavement Systems Division (PSD), Geotechnical Laboratory (GL). This report was prepared by Mr. Bentsen under the supervision of Messrs. J. W. Hall, Jr., Chief, Systems Analysis Branch, PSD, and H. H. Ulery, Jr., Chief, PSD. The work was under the general supervision of Dr. W. F. Marcuson III, Chief, GL, WES. Ms. Odell F. Allen, Visual Production Center, Information Technology Laboratory, edited the report.

Commander and Director of WES during the preparation and publication of this report was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.

CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
feet	0.30489	metres
inches	2.54	centimetres
pounds (force) per square inch	6.894757	kilopascals
square feet	0.09290304	square metres

CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE (NORTH BASE), CALIFORNIA

PART I: INTRODUCTION

Background

1. This report describes the condition survey and initial implementation of a pavement management system utilizing the PAVER system of the North Base Airfield pavements at Edwards Air Force Base (AFB), CA. The implementation was performed to provide base engineers with the initial data base required for making pavement management decisions concerning costs and maintenance requirements. The condition survey was performed by the US Army Engineer Waterways Experiment Station during the period 1 to 3 August 1989.

Objective and Scope

2. The overall objective of this project was to determine the pavement condition of the North Base Airfield pavements at Edwards AFB and to input the information into a Micro PAVER data base to provide the base engineers with a permanent data base to use for future pavement management decisions. This objective was accomplished by:

- a. Performing a condition survey of the pavements in accordance with AFR 93-5.*
- b. Inputting the pavement network and condition survey information into Micro PAVER to calculate a pavement condition index (PCI) of each of the pavement features.
- c. Producing detail drawings of the pavement features to ensure that future condition surveys will be performed at the same locations as the one performed for this report.

---

* Headquarters, Department of the Air Force. 1981 (May). "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

PART II: PAVEMENT CONDITION SURVEY

Introduction

3. A pavement condition survey is performed to determine the present surface condition of the various pavement features on an airfield. The procedure used in performing the condition survey was developed by the US Army Corps of Engineers and has been accepted as a regulation by the US Air Force.* The knowledge of the condition survey procedures discussed in AFR 93-5 is required for the use and understanding of this report.

Pavement Definition and Identification

4. The pavement network is divided into three specific units in order to manage the pavement network effectively. The three units of division are the feature, the section, and the sample unit. The method for dividing the pavement network is detailed in AFR 93-5 and is briefly discussed herein.

5. Airfield pavement features, or branches in some terminology, are defined by various parameters such as the pavement type, construction history, and pavement usage. The feature designations of North Base were most recently established in "Airfield Pavement Evaluation, Edwards Air Force Base (North Base), California,"** These feature designations, shown in Figure 1, are made under strict guidelines and any changes to them must be justified. Locating the features on the airfield itself is necessary before the performance of the condition survey can proceed. The physical property data for the features at North Base are given in Table 1.

6. After each pavement feature has been defined, further division of the feature may be required for reasons such as traffic flow. Further division of features is done into sections. For instance, a runway feature may be 150 ft† wide, but the majority of the traffic occurs in the middle of the

---

* Headquarters, Department of the Air Force. 1981. "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

** US Air Force Engineering and Services Center. 1981 (June). "Airfield Pavement Evaluation, Edwards Air Force Base (North Base), California," Tyndall AFB, FL.

† A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

feature. Therefore, a section is defined in the center of the feature with additional sections defined on either side of the middle section. Also, an apron may contain taxi lanes which the aircraft follow to their parking locations, a section which would differ from the areas used for the actual parking of the aircraft. Therefore, these elements of the feature are divided into sections. If a feature requires no division, for definition purposes it is still considered to contain one section.

7. After the pavement section definition has been completed, the section is divided into sample units, which are conveniently sized areas of pavement on which the inspection is performed. A standard sample unit on asphaltic concrete (AC) pavement is a 5,000-sq ft area, and a standard sample unit on portland cement concrete (PCC) pavement consists of 20 slabs. A pavement section is divided into sample units for condition survey purposes only. Recognizing that not all sample units can fit into the general requirement of 5,000 sq ft or 20 slabs, deviations of 25 percent on either side of these values are allowed for survey purposes.

8. When a section has been divided into sample units, it has been properly prepared for the survey. An inspection of all of the sample units within a large section could require a considerable amount of time. Therefore, the random sampling method was developed to provide an adequate calculation of the PCI while inspecting only a portion of the sample units in such a section. The method, further defined in AFR 93-5, allows for a reduction in the number of sample units surveyed without a significant loss of accuracy in the calculation of the PCI. It should be noted, however, that the inspection of all the sample units may be necessary for estimation of maintenance and repair work.

9. An essential concept in pavement management is determining the deterioration of the pavement surface over time. The PCI is used in the PAVER system to determine this deterioration. Determining the PCI of a pavement section at different time intervals requires that the same sample units of the section be surveyed to get a precise idea of the deterioration rate. Drawings of each of the pavement features and any section divisions have been included in this report to illustrate the sample units within each feature to permit future condition surveys to be conducted at these same locations. Figures 2 to 5 illustrate the sample unit layouts for each of the features and sections at North Base. The circled numbers indicate the sample units that were

surveyed. In features where no numbers are circled, the numbers shown indicate the sample units that were surveyed.

Pavement Inspection

10. The performance of a condition survey consists of inspecting the pavement surface of a sample unit for various types of distresses, determining the severity of each distress found, and measuring the amount of distress within the sample unit. Distress quantities on AC pavement are measured in either linear feet or square feet within the sample unit, and those on PCC pavement are measured by counting the number of slabs affected within the sample unit.

11. The product of the condition survey is the PCI of the sample unit. The PCI is a value from 0 to 100 (worst to best, respectively) of the surface condition of the pavement. The PCI is obtained by determining a deduct value for the amount of each distress type and the severity found in the inspection, determining a corrected deduct value for the combined effect of various distresses on the pavement condition, and subtracting the corrected deduct value from 100. A pavement with no distress has a PCI of 100. Varying amounts of distress decrease the PCI value to a possible low of 0. Pavement condition ratings (excellent to failed) are assigned to different levels of PCI values; these ratings and their respective PCI value definitions are shown in Figure 6. The PCI of the pavement section is calculated by averaging the PCI's of the sample units surveyed.

12. The majority of the pavement features at North Base are rated from fair to very good conditions with some features rated poor and excellent. Figure 7 illustrates the condition ratings of the features at North Base. Photos 1 through 6 show various distresses that were observed on the airfield pavements.

PART III: MICRO PAVER DATA BASE IMPLEMENTATION

13. The use of the PAVER pavement management system requires knowledge of both computers and the PAVER system itself. Micro PAVER is a microcomputer-based version of the PAVER pavement management system. When discussing the pavement management system itself, the terms PAVER and Micro PAVER are interchangeable. Discussions concerning the Micro PAVER data base and the operations involved with the Micro PAVER programs are specific to Micro PAVER. This report does not describe the operation of a computer; it does outline the necessary Micro PAVER procedures in moderate detail. The "Micro PAVER User's Guide"* goes into specific detail of all the procedures for setting up and using Micro PAVER and should be used as a reference when performing operations in the Micro PAVER system.

14. The Micro PAVER system consists of three different system functions. Performing each function requires the use of specific programs, files, and procedures. The three functions are data entry, report generation, and data analysis.

Data Entry

15. The pavement network data are entered into the Micro PAVER data base in a logical order that defines the features and sections first. The condition survey data and additional information are then entered which allows the user to perform data base related operations such as PCI calculation and report generation. Data are entered into the Micro PAVER data base through a series of menu-driven Micro PAVER programs.

16. Two ways to collect the condition survey data in the field are by recording the data manually on condition survey data sheets and later placing the data into the Micro PAVER data base, or by inputting the data directly into the FIELD program on a portable computer. The FIELD program places the data into the necessary Micro PAVER format as the data are entered into the computer and saves the data in a file that can be directly transferred to the Micro PAVER data base. The data for the North Base condition survey were collected on data sheets and later input into Micro PAVER.

---

* "Micro PAVER User's Guide," 1988 (Sep). US Army Corps of Engineers, Construction Engineering Research Laboratory.

Report Generation and Data Analysis

17. Micro PAVER generates reports that provide a summary or specific information utilizing the data stored in the data base. It also calculates information such as budget needs from data and analysis programs provided with the Micro PAVER system. These reports can be used to generate broad information of the entire data base or to list details from a selected portion of the pavement system. Brief descriptions of the Micro PAVER reports are given in Table 2. The data report and analysis programs provide an engineer with the information required to make pavement management decisions.

18. The results of two Micro PAVER reports have been included in this report. The Inspection Report produces a detailed summary of the distresses found in each sample unit surveyed as well as an extrapolation for the entire section. Table 3 gives the summary of the extrapolated distresses for each feature and section. The majority of the North Base pavement was constructed in the 1940's. Current traffic levels are fairly low and, except for the asphalt pavements, the surface condition is remaining constant with the only distress changes being environmentally related.

19. The Inspection Schedule Report gives the section surveying requirements for the next 5 years, depending on the minimum PCI and rate of deterioration deemed allowable for each section use and rank. The results of the Inspection Schedule Report are presented in Table 4. The minimum PCI and deterioration rates input to the Inspection Schedule Report were a minimum PCI of 70 for all features and allowable time limits between inspections of 1 year for rates of deterioration above 6 points per year, 3 years for rates of deterioration between 2 and 6 points per year, and 5 years for rates of deterioration below 2 points per year. Generally, the results in Table 4 are indicative of the current feature condition. The features requiring inspection in 1990 have a PCI of less than 70, and the features not requiring inspection until 1995 have a PCI greater than 70.

SUMMARY OF PHYSICAL PROPERTY

FACILITY					OVERLAY PAVEMENT			PAVEMENT				
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICK-NESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICK-NESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICK-NESS (IN)	DE
R1A	Runway 6-24	200	150	Very Good				8	PCC	750	9	[illegible]
R2A	Runway 6-24	800	150	Fair/ Good				4	AC		6	Si Gr S [illegible]
R3C	Runway 6-24	3,700	150	Fair/ Good				4	AC		6	Si Gr S (S
R4A	Runway 6-24	300	150	Very Good				8.5	PCC	740	9	Si Gr Sa (Sw
R5A	Runway 6-24	800	150	Good				4	AC		6	Si Gr S [illegible]
R6A	Runway 6-24	200	150	Very Good				9	PCC	850	9	Si Gr Sa (Sw
T1A	Main Taxiway	1,635	100	Good				5	AC		6	Si Gr San (Sw
T2A	Main Taxiway	150	300	Very Good				7.5	PCC	775	9	Sil Gr San (Sw
T3A	Apron Access Taxiway	450	75	Fair				6	PCC	700	6	Sil Gra San (Sw

(Continued)

Table 1

RY OF PHYSICAL PROPERTY DATA

OVERLAY PAVEMENT		PAVEMENT			BASE				SUBBASE			SUBGRADE		
ESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR %	K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR %	K PSI/IN
		[illegible]	PCC	750	9	Silty Gravelly Sand (SW-SM)		125				Silty Sand (SM)		
		[illegible]	AC		6	Silty Gravelly Sand (SW-SM)	30					Silty Sand (SM)	35	
		[illegible]	AC		6	Silty Gravelly Sand (SW-SM)	30					Silty Sand (SM)	35	
		[illegible]	PCC	740	9	Silty Gravelly Sand (SW-SM)		150				Silty Sand (SM)		
		[illegible]	AC		6	Silty Gravelly Sand (SW-SM)	40					Silty Sand (SM)	40	
		9	PCC	850	9	Silty Gravelly Sand (SW-SM)		250				Silty Sand (SM)		
		5	AC		6	Silty Gravelly Sand (SW-SM)	30					Silty Sand (SM)	35	
		7.5	PCC	775	9	Silty Gravelly Sand (SW-SM)		150				Silty Sand (SM)		
		6	PCC	700	6	Silty Gravelly Sand (SW-SM)		250				Silty Sand (SM)		

(Continued)

SUMMARY OF PHYSICAL PROPERTY

FACILITY					OVERLAY PAVEMENT			PAVEMENT				
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DI
T4A	Apron Access Taxiway	470	75	Fair				7	PCC	675	6	[illegible]
T5C	Taxiway to Lakebed	350	100	Good				2	AC			
T6A	Hangar Access Taxiway	1,120	100	Very Good				10.5	PCC	700		
A1B	West End Turnaround	200	50	Very Good				7	PCC	600		
A2B	East End Turnaround	200	50	Very Good				9	PCC	590		
A3B	Apron	Varies	175	Poor				7	PCC	550		
A4B	Maintenance Apron	Varies	Varies	Poor				6	PCC	750	6	[illegible]
A5B	Apron	1,010	65	Excellent				9	PCC	775		
A7B	Hangar Apron	Varies	Varies	Very Good				10	PCC			

Table 1 (Concluded)

MARY OF PHYSICAL PROPERTY DATA

OVERLAY PAVEMENT			PAVEMENT			BASE				SUBBASE			SUBGRADE		
HICK-IESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICK-NESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICK-NESS (IN)	DESCRIPTION	CBR %	K PSI/IN	THICK-NESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR %	K PSI/IN
			7	PCC	675	6	Silty Gravelly Sand (SW-SM)		250				Silty Sand (SM)		
			2	AC									Silty Sand (SM)	40	
			10.5	PCC	700								Silty Sand (SM)		250
			7	PCC	600								Silty Sand (SM)		125
			4	PCC	590								Silty Sand (SM)		225
			7	PCC	550								Silty Sand (SM)		200
			6	PCC	750	6	Silty Gravelly Sand (SW-SM)		250				Silty Sand (SM)		
			9	PCC	775								Silty Sand (SM)		225
			10	PCC									Silty Sand (SM)		

Table 2

Micro PAVER Reports

List	-	Lists the branch name, number, and number of sections in each branch.
Inventory	-	Provides inventory information of the pavement sections.
PCI	-	Provides branch and section information, last construction and inspection dates, age, and PCI for each branch/section combination.
Inspection	-	Provides both the summary and sample unit PCI and distress information for the pavement sections.
PCI Frequency	-	Provides an overall condition frequency, based on PCI, for the year requested.
Budget Planning	-	Provides a 5-year budget by estimating the costs to maintain the pavements above a given condition level.
Budget Condition Forecasts	-	A combination of the PCI frequency and budget planning reports; this predicts the budget and pavement condition depending on the repairs performed.
Inspection Schedule	-	Provides a schedule of sections to be inspected during a 5-year period.
Condition History	-	Provides a PCI versus time curve of a specific section, including a 5-year projection.
Family Curve	-	Models and predicts pavement condition of sections of a specific type, use, and rank (a family).
Section Prediction	-	Uses a family curve to predict the condition of selected sections.
M & R	-	Determines repair and overlay costs depending on the user's maintenance and repair policy.
Network Maintenance	-	Determines the repair costs over the entire network depending on the user's maintenance and repair policy.
Economic Analysis	-	Provides the user with annual cost information to help determine the most economical M & R alternative.
Pavement Performance Prediction	-	Nondata base PCI prediction models for AC or PCC pavements.

Table 3

Extrapolated Distress Summary, North Base

Feature	Section	Distress	Severity	Extrapolated Quantity	Percent of Total Area
R01A	1	Jt* Seal Damage	H	168 slabs	100.00
		Small Patch	L	19 slabs	11.36
		Small Patch	M	3 slabs	2.27
		Joint Spall	L	67 slabs	40.15
		Joint Spall	M	1 slab	0.76
		Corner Spall	L	11 slabs	6.82
R02A	1	Alligator Crack	L	1,081 sq ft	2.70
		Alligator Crack	M	160 sq ft	0.40
		Alligator Crack	H	11 sq ft	0.03
		Block Cracking	L	192 sq ft	0.48
		L & T** Cracking	L	3,627 lin ft	9.07
		L & T Cracking	M	1,416 lin ft	3.54
		Patching	L	40 sq ft	0.10
	2	Alligator Crack	M	400 sq ft	1.00
		Block Cracking	L	13,580 sq ft	33.95
		L & T Cracking	L	2,024 lin ft	5.06
		L & T Cracking	M	420 lin ft	1.05
	3	Block Cracking	L	13,909 sq ft	34.77
		L & T Cracking	L	2,307 lin ft	5.77
		L & T Cracking	M	407 lin ft	1.02
		L & T Cracking	H	207 lin ft	0.52
R03C	1	Alligator Crack	L	11,766 sq ft	6.36
		Alligator Crack	M	5,069 sq ft	2.74
		Block Cracking	L	57,905 sq ft	31.30
		L & T Cracking	L	6,401 lin ft	3.46
		L & T Cracking	M	2,794 lin ft	1.51
	2	Alligator Crack	L	1,009 sq ft	0.55
		Block Cracking	L	93,428 sq ft	50.50
		Block Cracking	M	1,682 sq ft	0.91
		L & T Cracking	L	7,232 lin ft	3.91
		L & T Cracking	M	404 lin ft	0.22
	3	Block Cracking	L	97,325 sq ft	52.61
		L & T Cracking	L	5,652 lin ft	3.06
		L & T Cracking	M	231 lin ft	0.13

(Continued)

* Jt = joint.
** L & T = Longitudinal and transverse.

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity	Percent of Total Area
R04A	1	Corner Break	M	2 slabs	1.11
		Linear Cracking	L	1 slab	0.56
		Jt Seal Damage	H	240 slabs	100.00
		Small Patch	L	81 slabs	33.89
		Small Patch	M	5 slabs	2.22
		Joint Spall	L	117 slabs	48.89
		Joint Spall	M	1 slab	0.56
		Corner Spall	L	22 slabs	9.44
		Corner Spall	M	8 slabs	3.33
R05A	1	Alligator Crack	L	207 sq ft	0.52
		Block Cracking	L	20,367 SQ FT	50.92
		L & T Cracking	L	1,320 lin ft	3.30
	2	Block Cracking	L	28,400 sq ft	71.00
		Block Cracking	M	100 sq ft	0.25
		L & T Cracking	L	800 lin ft	2.00
		L & T Cracking	M	133 lin ft	0.33
	3	Alligator Crack	L	800 sq ft	2.00
		Alligator Crack	M	200 sq ft	0.50
		Block Cracking	L	24,700 sq ft	61.75
		Block Cracking	M	933 sq ft	2.33
		L & T Cracking	L	1,133 lin ft	2.83
R06A	1	Corner Break	L	1 slab	0.76
		Linear Cracking	L	1 slab	0.76
		Jt Seal Damage	H	168 slabs	100.00
		Small Patch	L	16 slabs	9.85
		Small Patch	M	3 slabs	2.27
		Joint Spall	L	72 slabs	43.18
		Joint Spall	M	1 slab	0.76
		Corner Spall	L	7 slabs	4.55
T01A	1	Alligator Crack	L	1,053 sq ft	0.64
		Block Cracking	L	160,815 sq ft	97.76
		Depression	L	474 sq ft	0.29
		L & T Cracking	M	105 lin ft	0.06

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity	Percent of Total Area
T02A	1	Corner Break	L	1 slab	0.56
		Linear Cracking	L	1 slab	0.56
		Jt Seal Damage	H	240 slabs	100.00
		Small Patch	L	40 slabs	16.67
		Small Patch	M	9 slabs	3.89
		Large Patch	L	1 slab	0.56
		Joint Spall	L	92 slabs	38.33
		Joint Spall	M	1 slab	0.56
		Corner Spall	L	8 slabs	0.33
		Corner Spall	M	1 slab	0.56
T03A	1	Corner Break	L	23 slabs	13.19
		Corner Break	M	6 slabs	3.47
		Corner Break	H	6 slabs	3.47
		Linear Cracking	L	28 slabs	15.97
		Linear Cracking	M	10 slabs	5.56
		Small Patch	L	65 slabs	36.11
		Small Patch	M	10 slabs	5.56
		Large Patch	L	12 slabs	6.94
		Shattered Slab	L	7 slabs	4.17
		Shattered Slab	M	16 slabs	9.03
		Shattered Slab	H	2 slabs	1.39
		Shrinkage Crack	N/A	55 slabs	30.56
		Joint Spall	L	7 slabs	4.17
		Joint Spall	M	3 slabs	2.08
		Corner Spall	L	5 slabs	2.78
		Corner Spall	M	1 slab	0.69
T04A	1	Corner Break	L	28 slabs	15.28
		Corner Break	M	12 slabs	6.94
		Corner Break	H	16 slabs	9.03
		Linear Cracking	L	22 slabs	11.81
		Linear Cracking	M	1 slab	0.69
		Small Patch	L	80 slabs	43.06
		Small Patch	M	3 slabs	2.08
		Large Patch	L	1 slab	0.69
		Shattered Slab	L	10 slabs	5.56
		Shattered Slab	M	5 slabs	2.78
		Shattered Slab	H	2 slabs	1.39
		Shrinkage Crack	N/A	53 slabs	28.47
		Joint Spall	L	11 slabs	6.25
		Joint Spall	M	1 slab	0.69
		Corner Spall	L	6 slabs	3.47

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity	Percent of Total Area
T05C	1	Alligator Crack	L	1,880 sq ft	5.37
		Block Cracking	M	7,000 sq ft	20.00
		L & T Cracking	L	1,481 lin ft	4.23
		L & T Cracking	M	870 lin ft	2.49
T06A	1	Corner Break	M	1 slab	0.27
		Linear Cracking	L	20 slabs	3.30
		Jt Seal Damage	M	616 slabs	100.00
		Small Patch	L	74 slabs	12.09
		Small Patch	M	6 slabs	1.10
		Shrinkage Crack	N/A	121 slabs	19.78
		Joint Spall	L	3 slabs	0.55
		Joint Spall	M	1 slab	0.27
		Corner Spall	L	8 slabs	1.37
		Corner Spall	M	1 slab	0.27
A01B	1	Jt Seal Damage	H	80 slabs	100.00
		Joint Spall	L	28 slabs	35.00
		Corner Spall	L	4 slabs	5.00
A02B	1	Linear Cracking	L	1 slab	1.25
		Linear Cracking	M	5 slabs	6.25
		Jt Seal Damage	H	80 slabs	100.00
		Shrinkage Crack	N/A	1 slab	1.25
		Joint Spall	L	12 slabs	15.00
		Corner Spall	L	3 slabs	3.75
A03B	1	Corner Break	L	2 slabs	2.08
		Linear Cracking	L	25 slabs	25.00
		Linear Cracking	M	5 slabs	5.21
		Jt Seal Damage	M	101 slabs	100.00
		Small Patch	L	5 slabs	5.21
		Large Patch	L	6 slabs	6.25
		Shattered Slab	L	49 slabs	48.96
		Shattered Slab	M	10 slabs	10.42
		Shattered Slab	H	1 slab	1.04
		Shrinkage Crack	N/A	3 slabs	3.13

(Continued)

Table 3 (Concluded)

Feature	Section	Distress	Severity	Extrapolated Quantity	Percent of Total Area
A04B	1	Corner Break	L	4 slabs	3.92
		Corner Break	H	2 slabs	1.96
		Linear Cracking	L	3 slabs	2.94
		Jt Seal Damage	L	94 slabs	86.27
		Jt Seal Damage	H	15 slabs	13.73
		Small Patch	L	6 slabs	5.88
		Small Patch	M	1 slab	0.98
		Shattered Slab	L	1 slab	0.98
		Shattered Slab	M	22 slabs	20.59
		Shattered Slab	H	15 slabs	13.73
		Shrinkage Crack	N/A	14 slabs	12.75
		Joint Spall	L	2 slabs	1.96
		Joint Spall	M	2 slabs	1.96
		Joint Spall	H	3 slabs	2.94
		Corner Spall	L	3 slabs	2.94
		Corner Spall	M	3 slabs	2.94
		Corner Spall	H	3 slabs	2.94
A05B	1	Linear Cracking	L	3 slabs	1.15
		Small Patch	L	69 slabs	20.38
		Small Patch	M	1 slab	0.38
		Large Patch	L	1 slab	0.38
		Shrinkage Crack	N/A	17 slabs	5.00
		Joint Spall	L	5 slabs	1.54
		Joint Spall	M	2 slabs	0.77
		Joint Spall	H	7 slabs	2.31
		Corner Spall	L	1 slab	0.38
		Corner Spall	H	1 slab	0.38
A07B	1	Blowup	L	2 slabs	0.60
		Linear Cracking	L	18 slabs	3.92
		Linear Cracking	M	1 slab	0.30
		Jt Seal Damage	M	480 slabs	100.00
		Small Patch	L	56 slabs	11.75
		Large Patch	L	11 slabs	2.41
		Scaling	L	5 slabs	1.20
		Shrinkage Crack	N/A	134 slabs	28.01
		Joint Spall	L	1 slab	0.30
		Joint Spall	M	4 slabs	0.90
		Corner Spall	L	7 slabs	1.51
		Corner Spall	M	2 slabs	0.60

(Sheet 5 of 5)

Table 4

A 5-Year Inspection Schedule, North Base

Year to Inspect	Feature	Sections
1990	R02A	1, 2, 3
	R03C	1, 2, 3
	R05C	1, 2, 3
	T01A	1
	T03A	1
	T04A	1
	T05C	1
	A03B	1
	A04B	1
1995	R01A	1
	R04A	1
	R06A	1
	T02A	1
	T06A	1
	A01B	1
	A02B	1
	A05B	1
	A07B	1

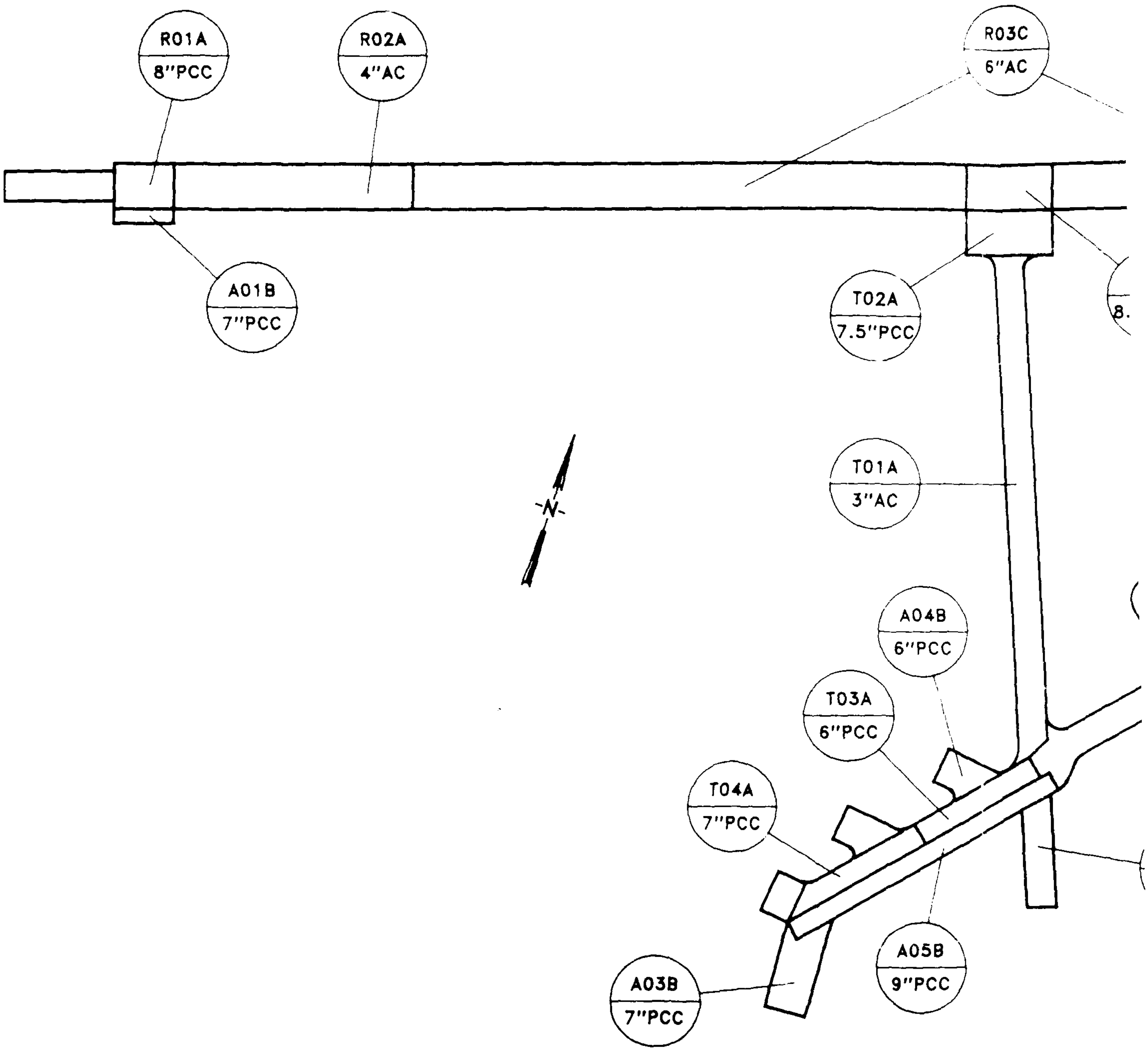
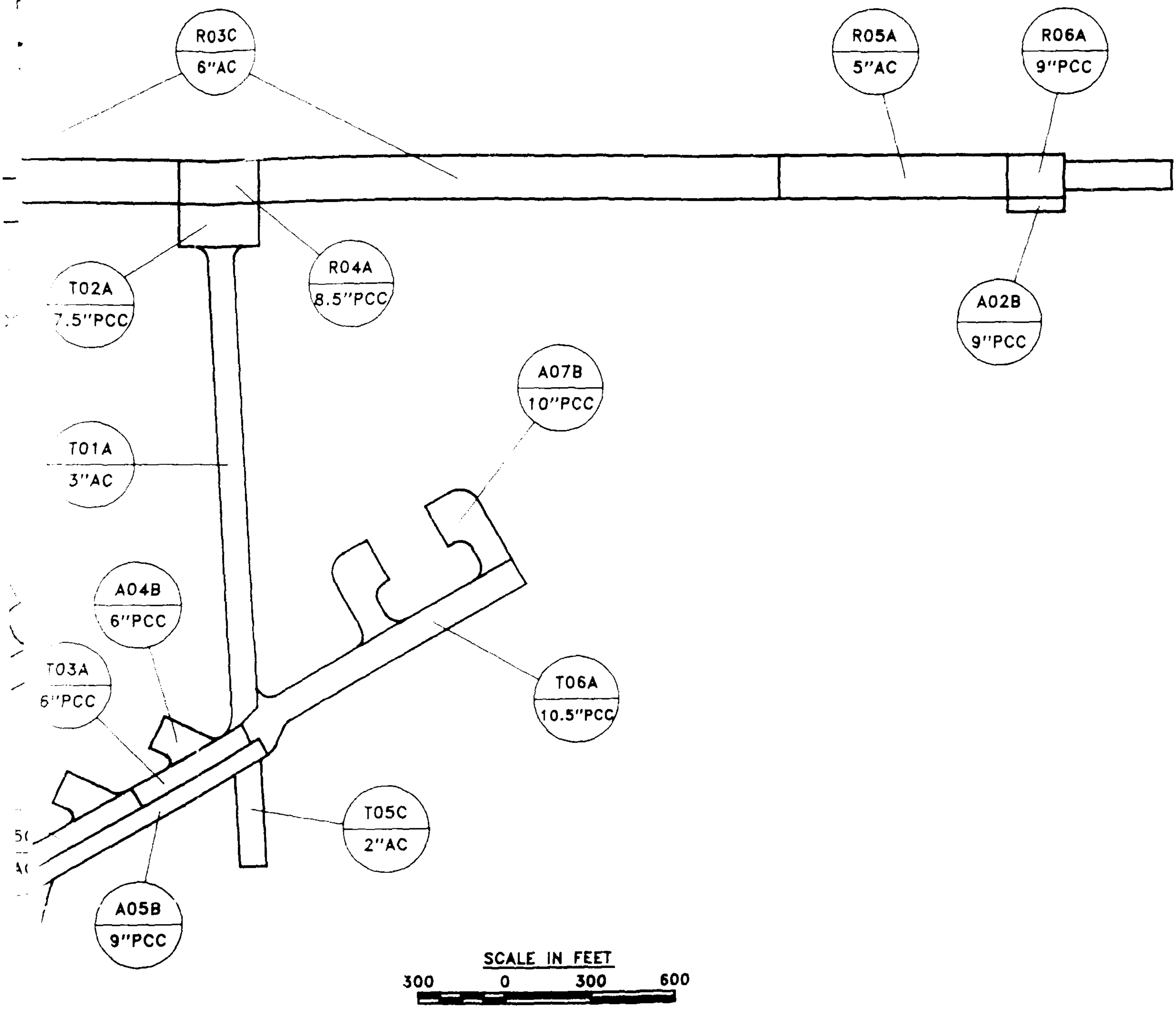


Figure 1. Airfield pavement feature ident



rfield pavement feature identifications of North Base

a

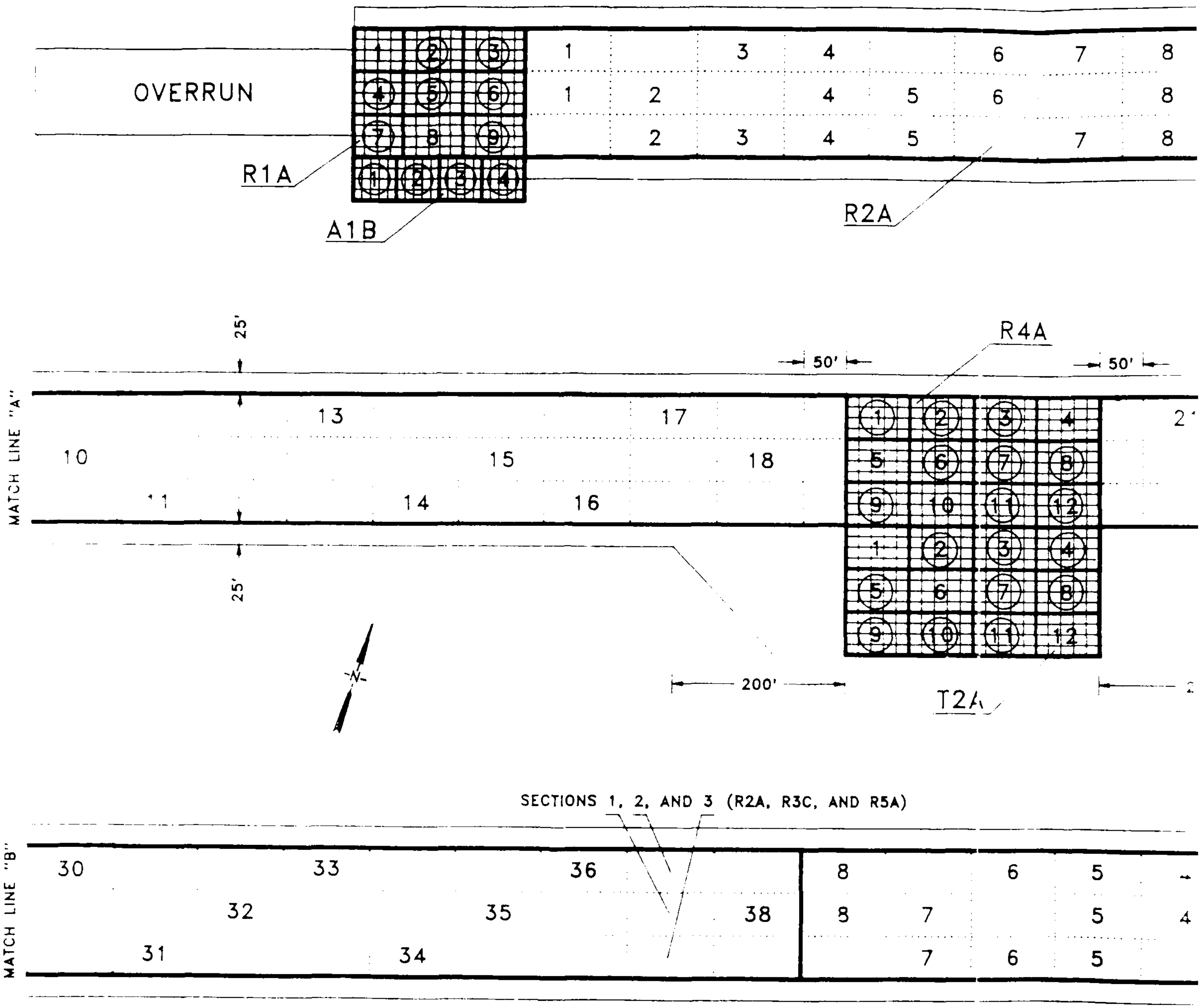
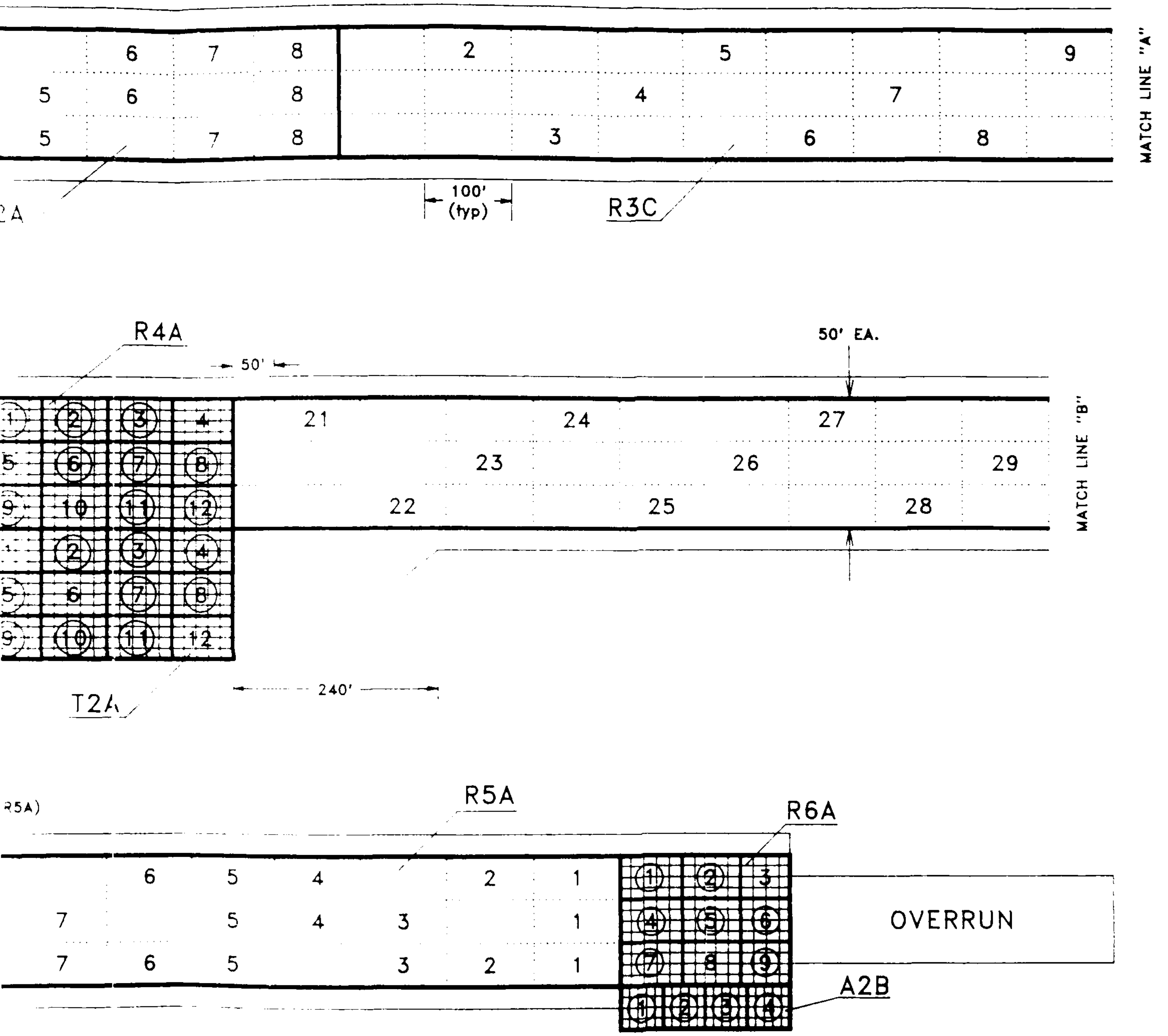
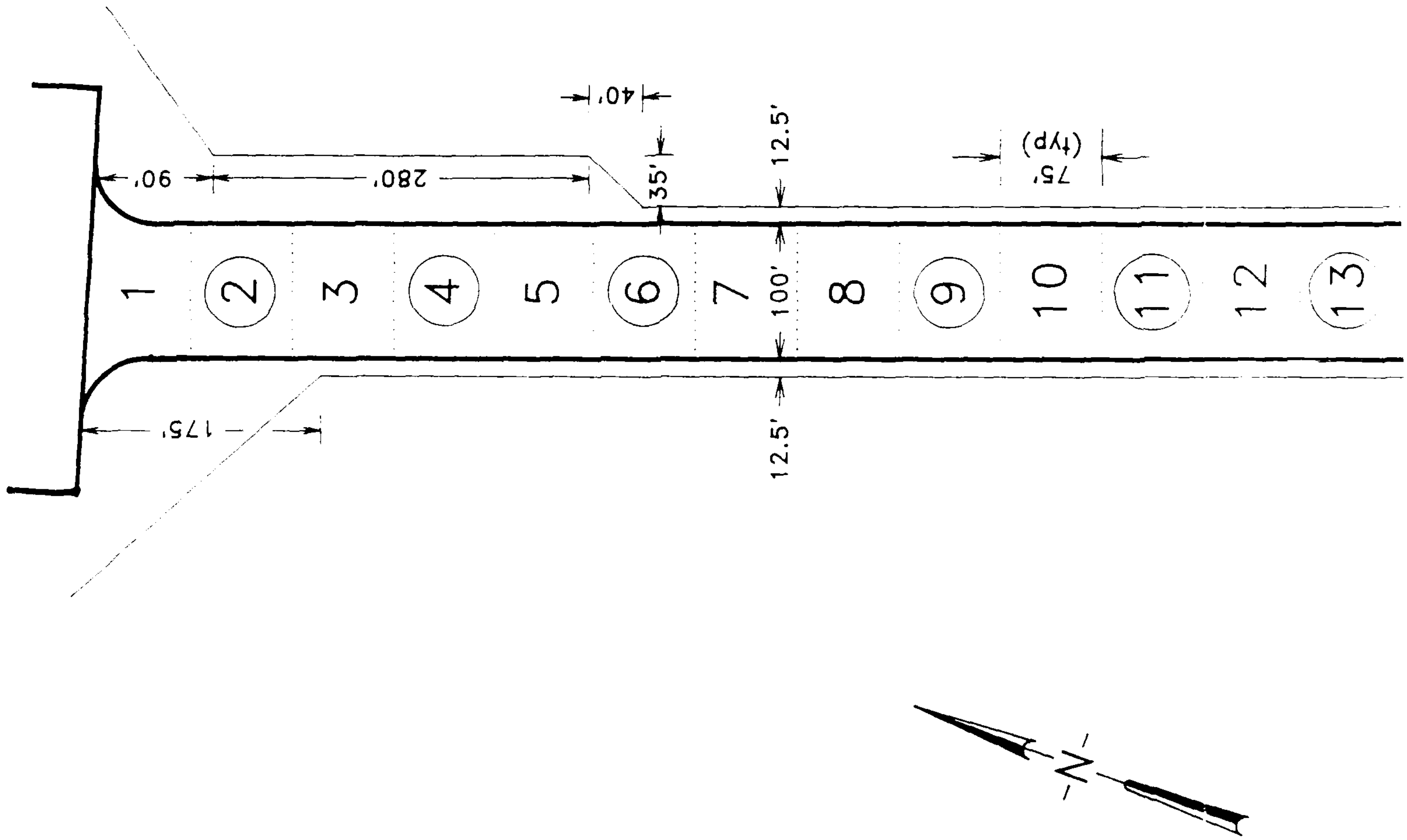


Figure 2. Sample unit layout, Runway 6-24 (features R1A, R2A, R3C, taxiway (feature T2A)



-24 (features R1A, R2A, R3C, R4A, R5A, and R6A) and the main
axiway (feature T2A)



1
2
3
4
5
6
7
8
9
10
11
12
13
90'
280'
40'
35'
12.5'
100'
12.5'
75' (typ)
175'
N

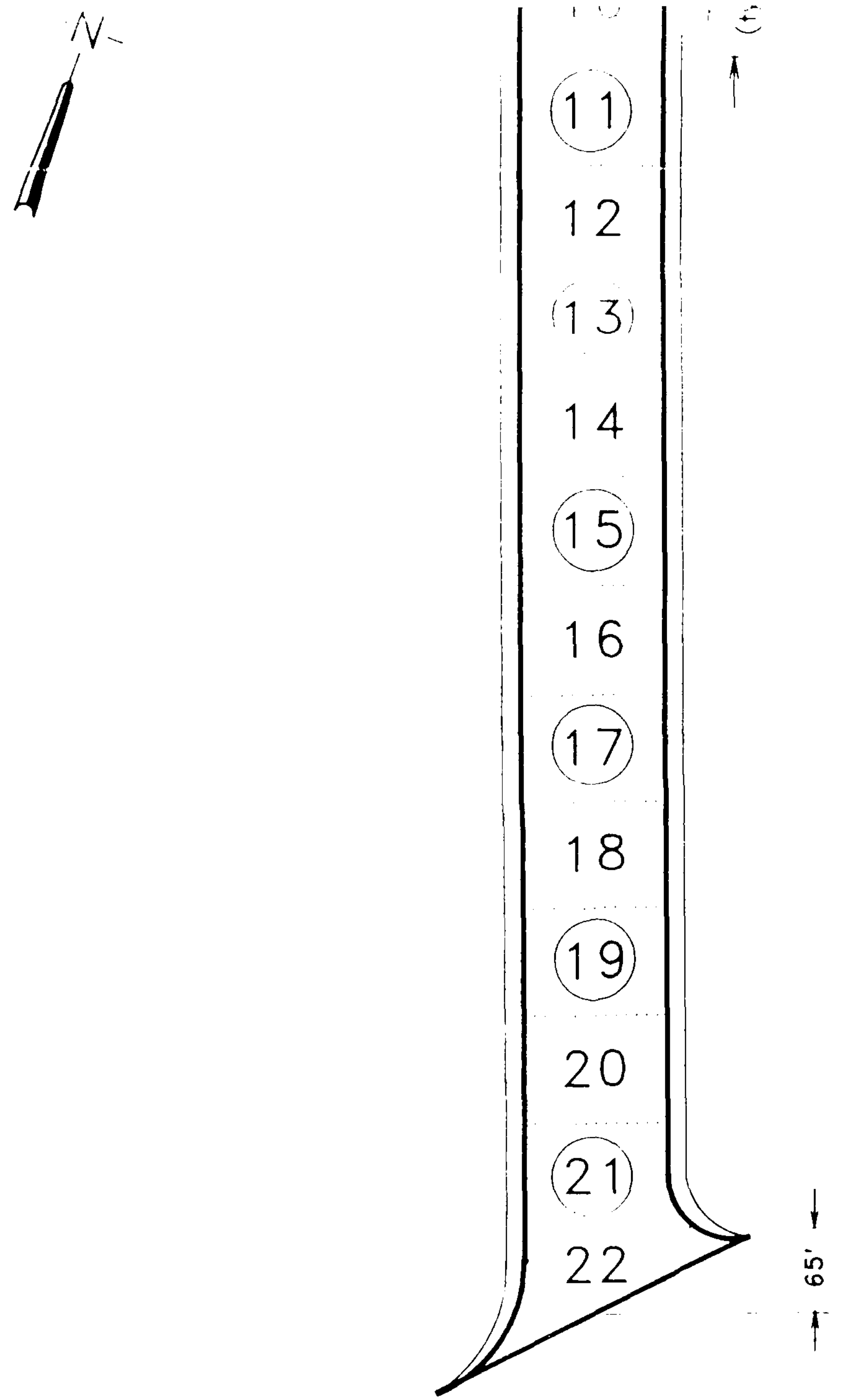


Figure 3. Sample unit layout, the main taxiway (feature T1A)

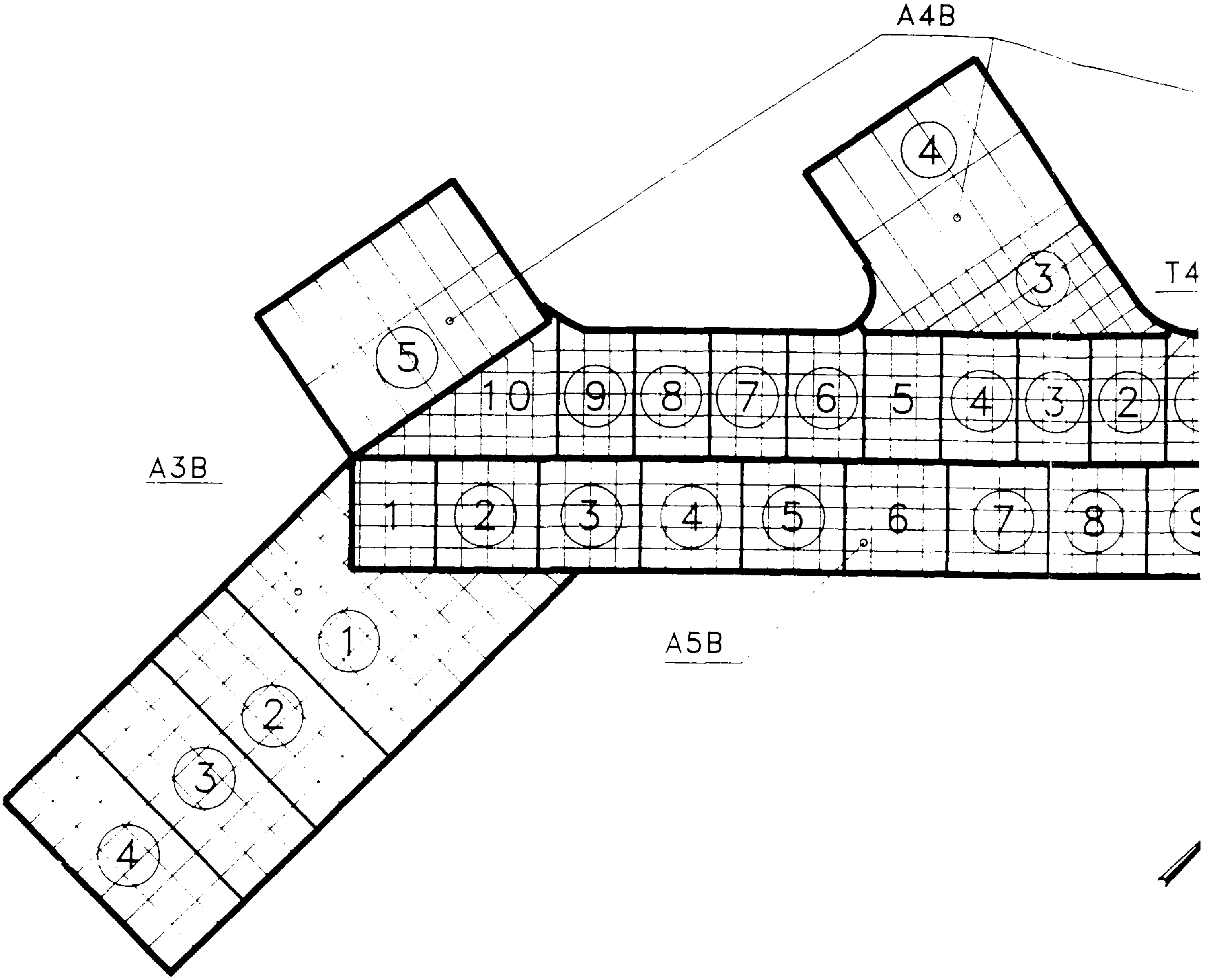
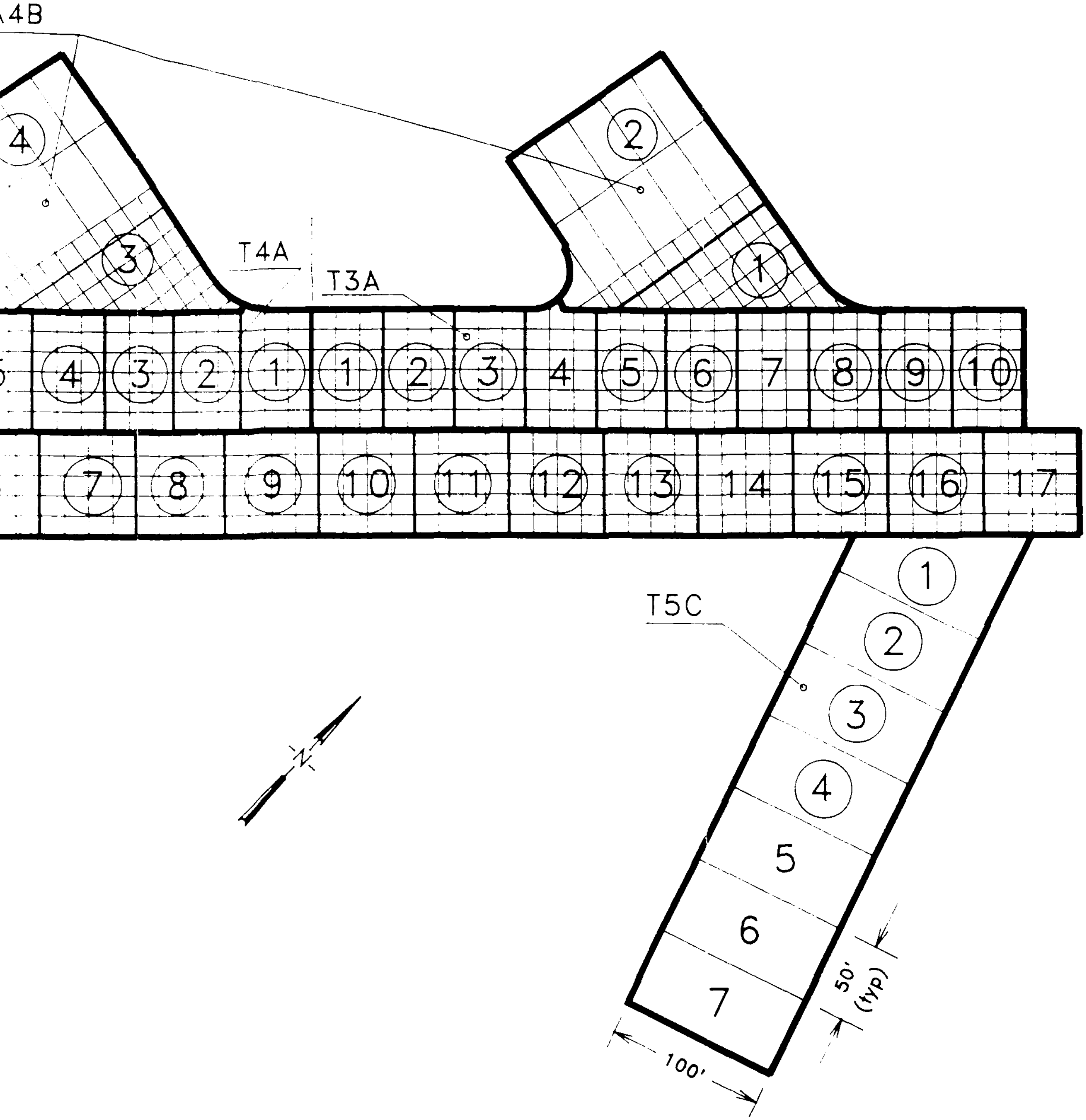


Figure 4. Sample unit layout, the apron access taxiway (features
and aprons (features A3B,



access taxiway (features T3A and T4A), the taxiway to lakebed (feature T5C),
nd aprons (features A3B, A4B and A5B)

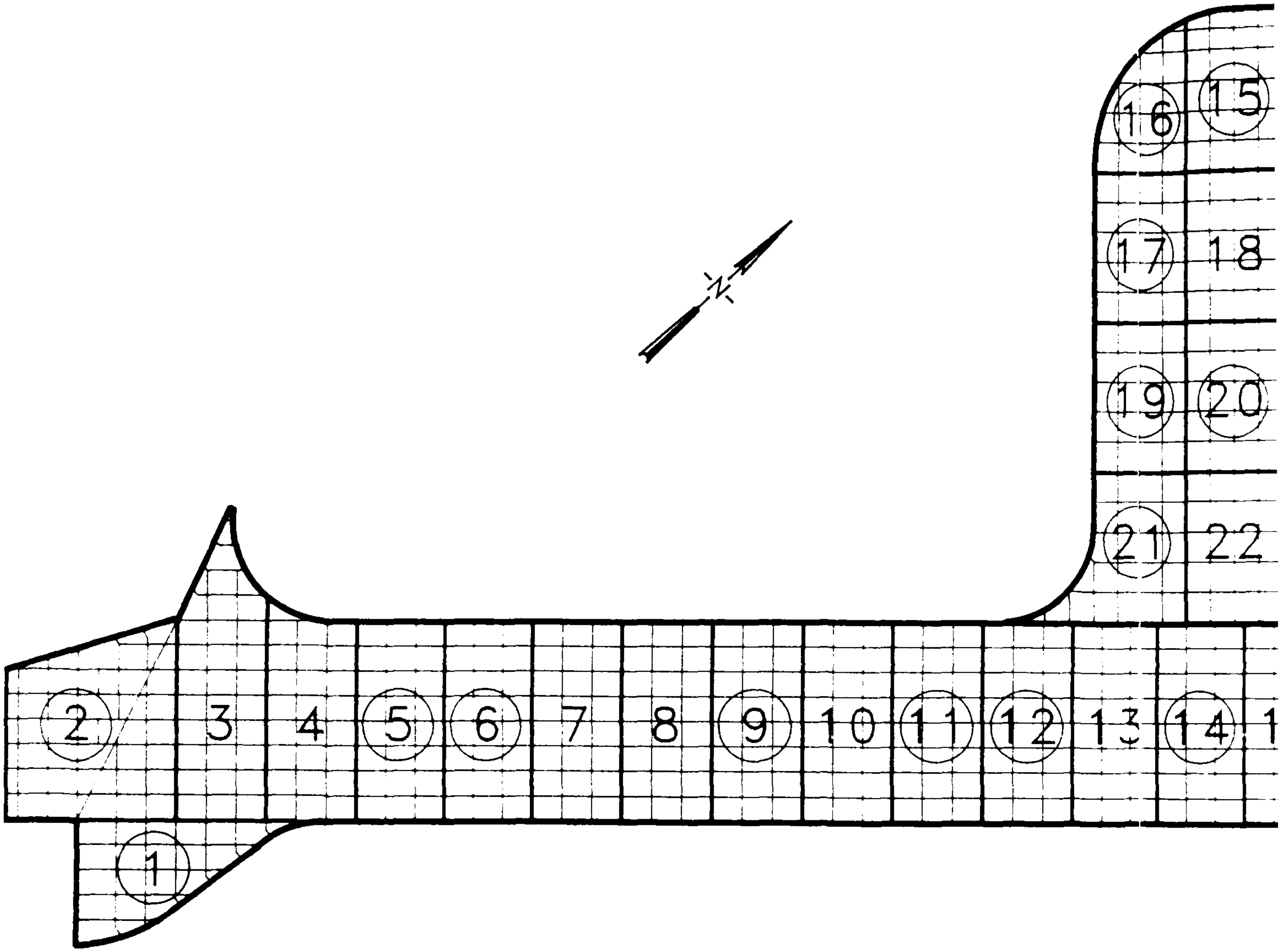
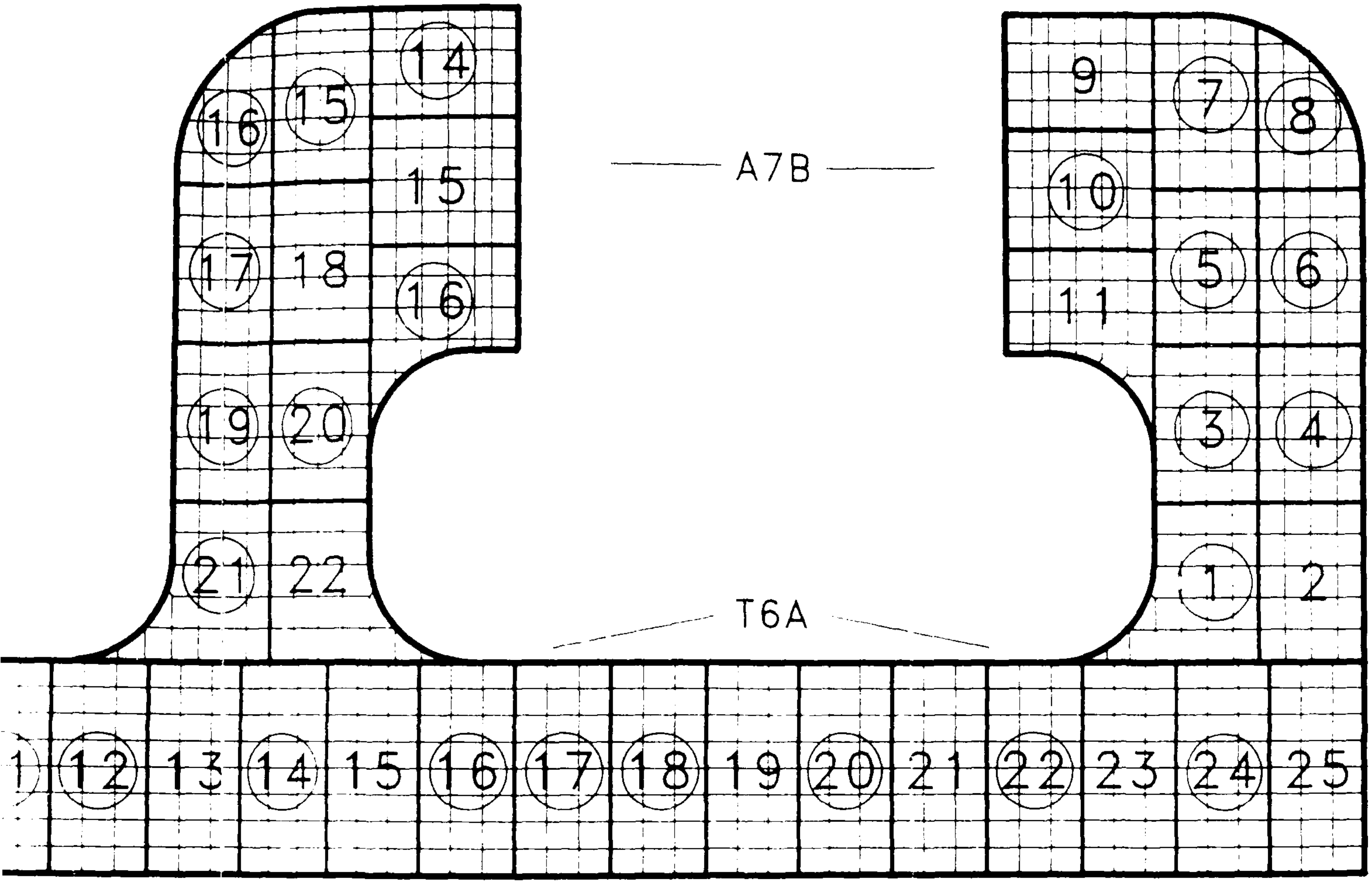


Figure 5. Sample unit layout, the hangar access taxiway



the hangar access taxiway (feature T6A) and hangar apron (feature A7B)

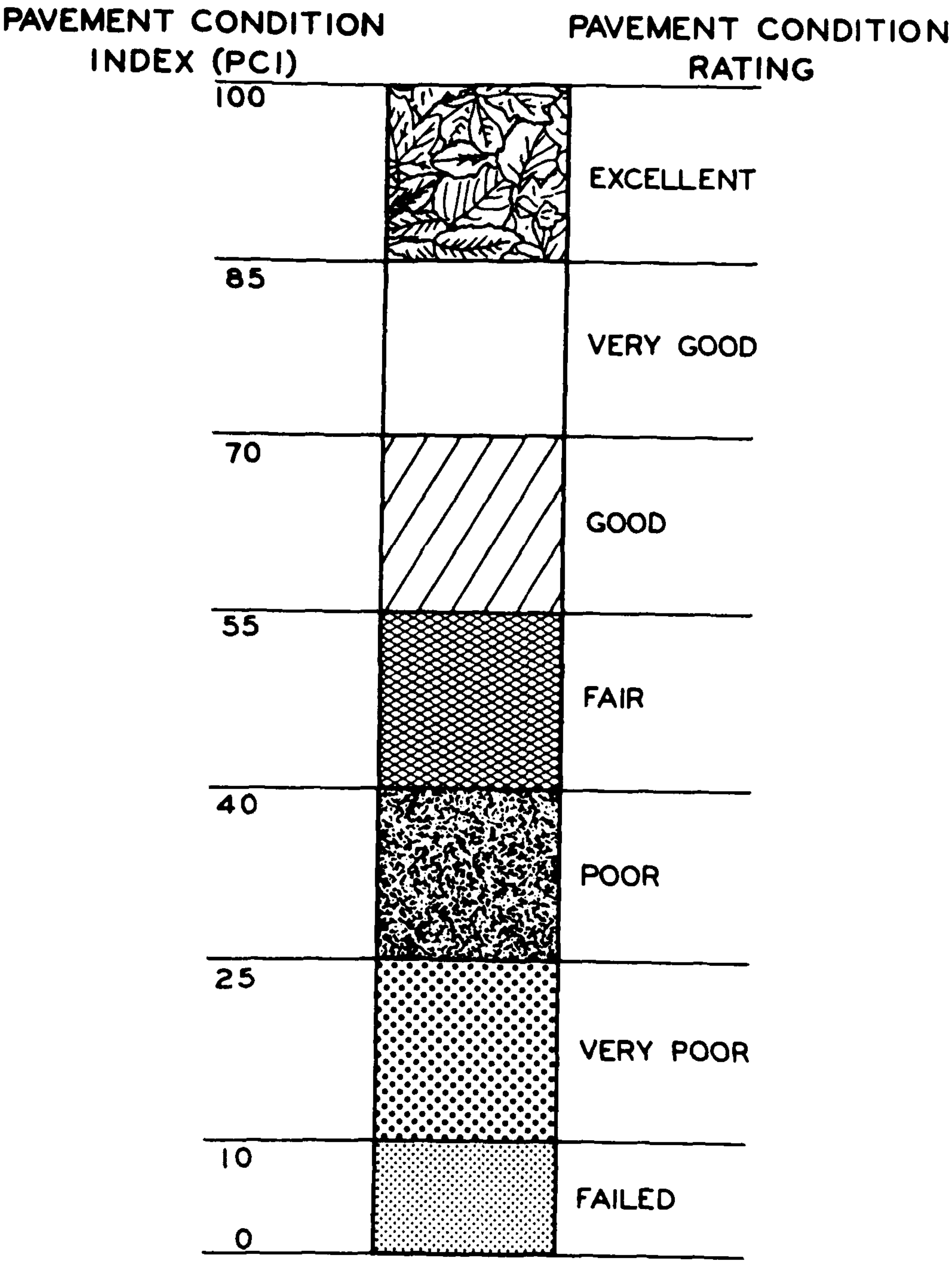


Figure 6. Scale for pavement condition ratings

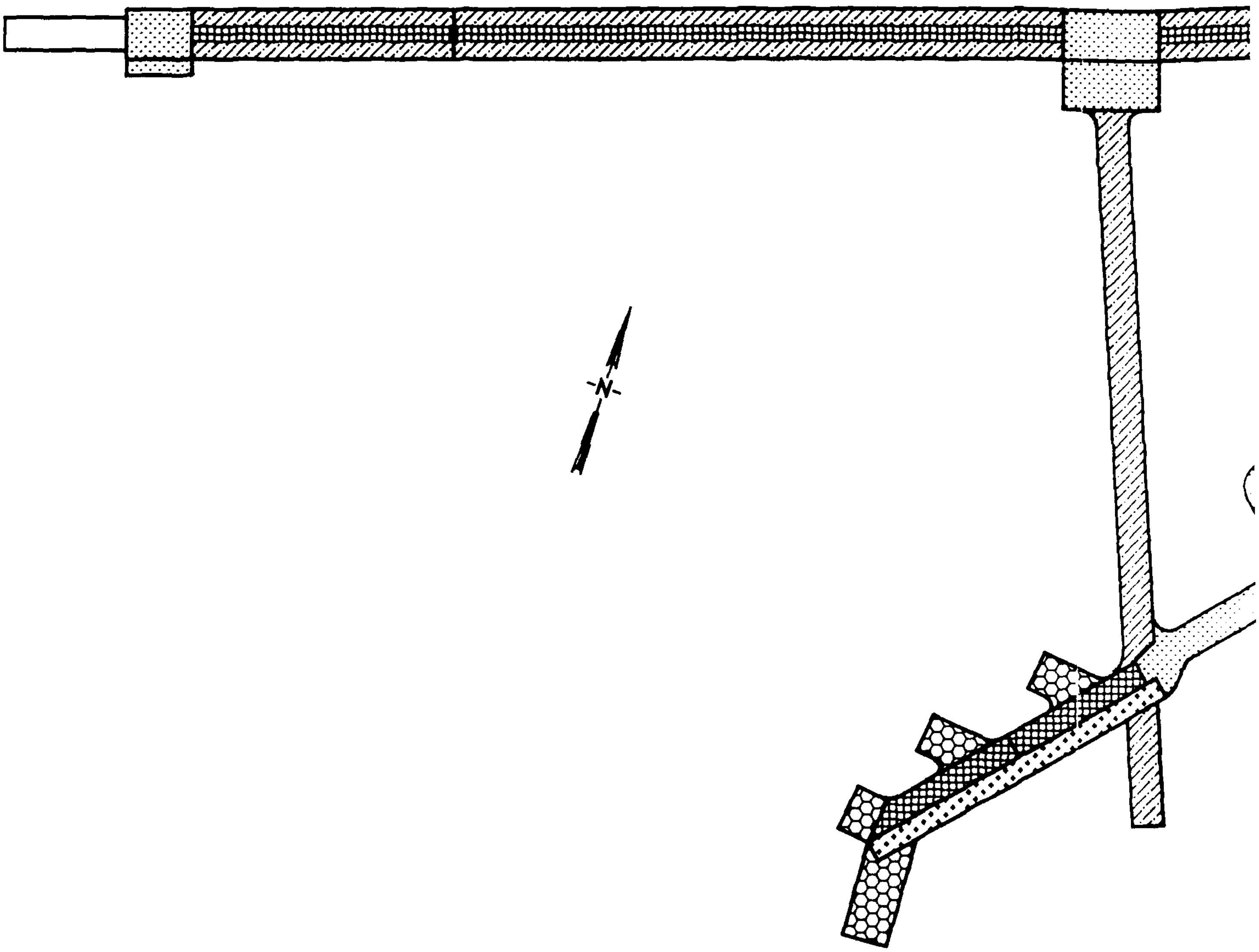
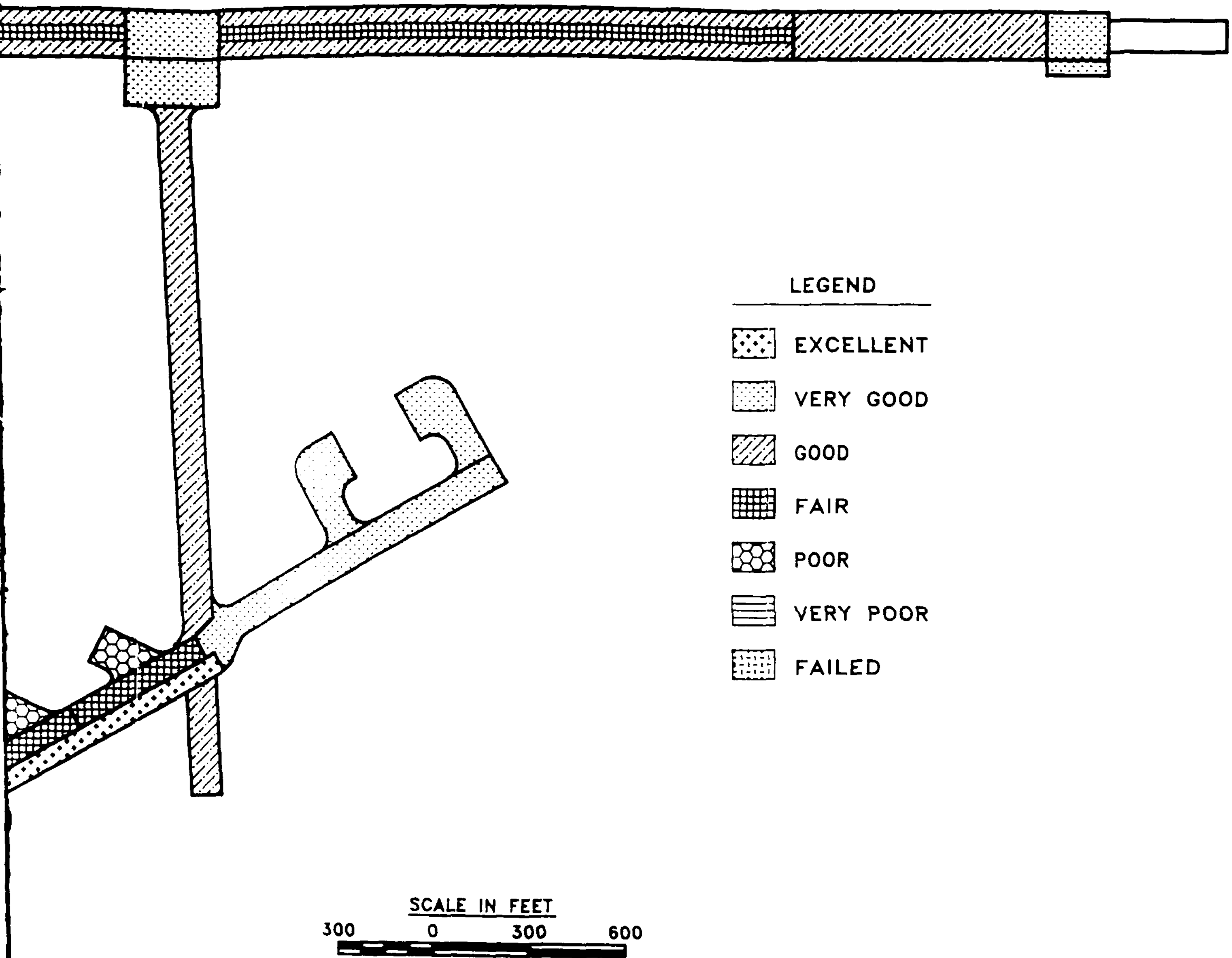


Figure 7. Pavement condition ratir



Pavement condition ratings of North Base

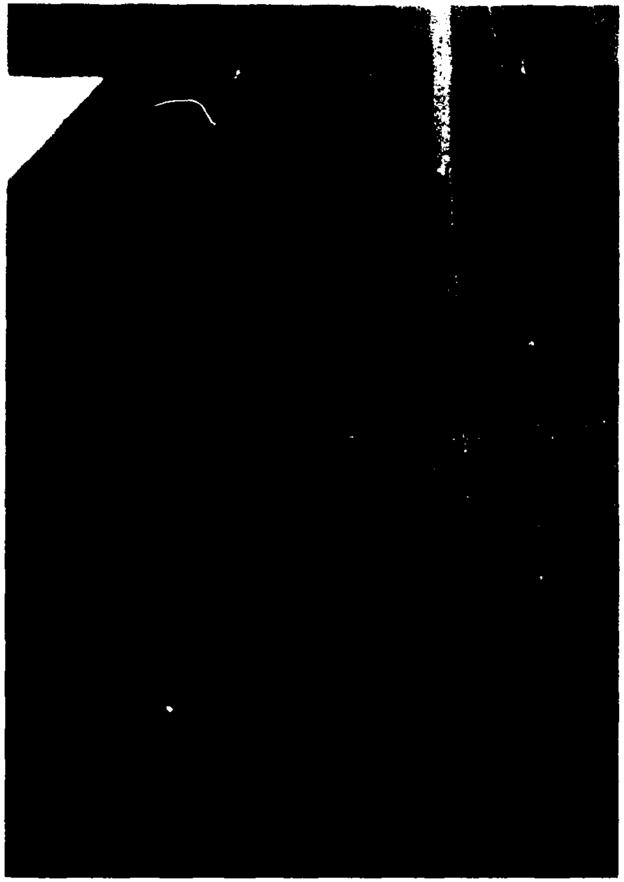


Photo 1. Medium-severity alligator cracking, Runway 6-24 (R3C)

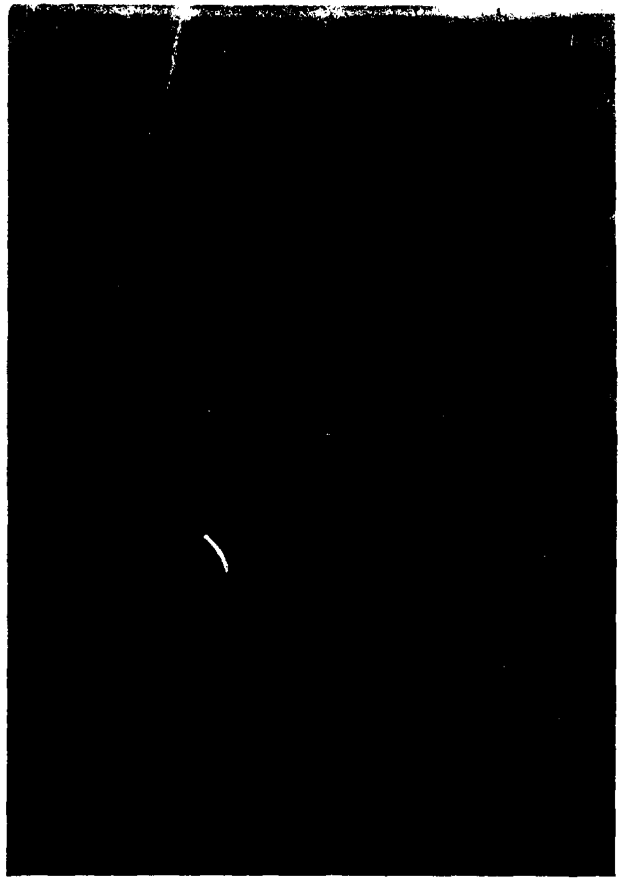


Photo 2. Low-severity alligator cracking, Runway 6-24 (R3C)

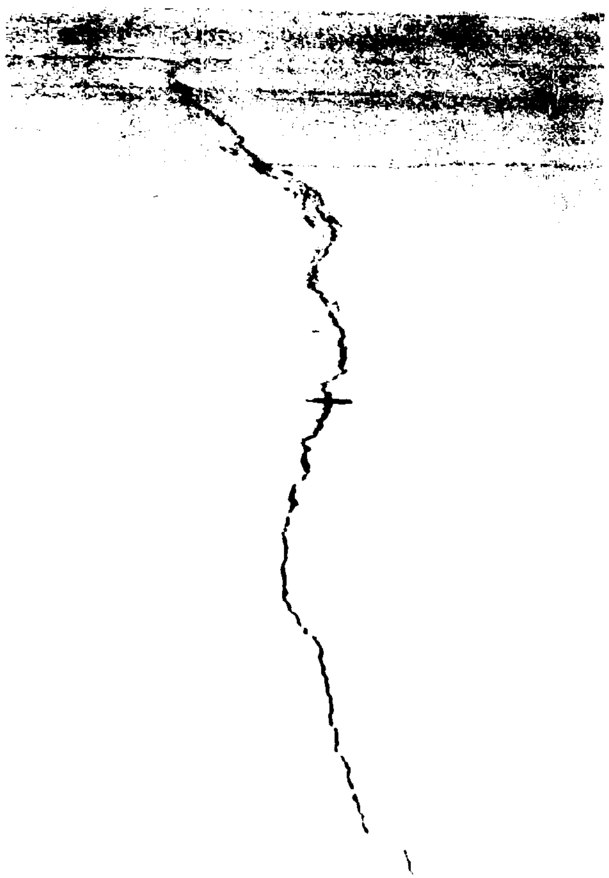


Photo 3. Medium-severity transverse crack, Runway 6-24 (R3C)

Photo 4. High-severity corner breaks, apron access taxiway (T3A)

Photo 5. High-severity shattered slab, apron access taxiway (T4A)

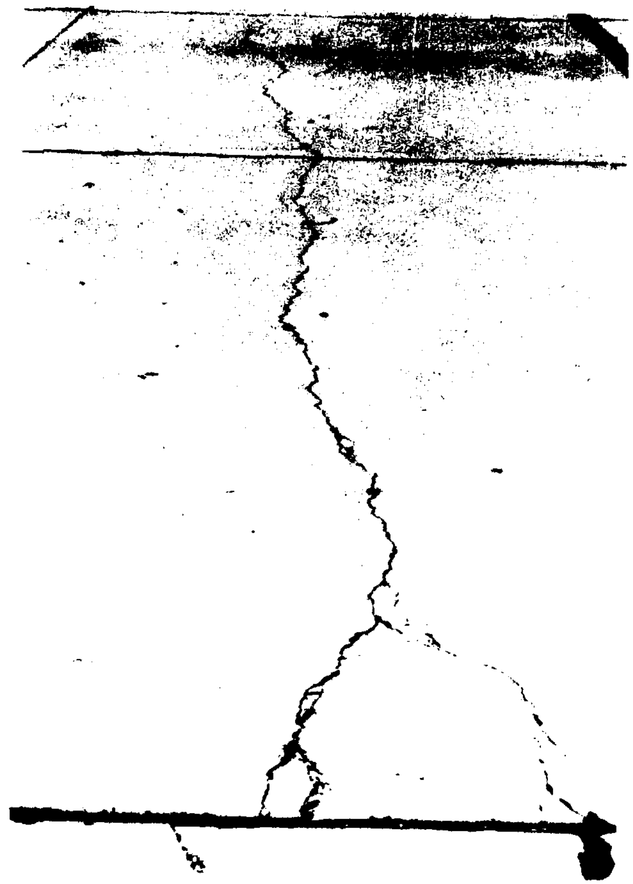


Photo 6. Medium-severity linear crack, apron access taxiway (T4A)